



Chapter 2

Equatorial deforestation as a harmful practice and a criminological issue

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An outbreak of violence in the Peruvian Amazon

In early June 2009, violent and deadly fights broke out between police and Amazon tribal groups on a jungle highway in northern Peru. It was the violent culmination of a 2-month-long campaign of peaceful rallies and blockades across Peru's Amazon region by indigenous groups. They protested against two decrees, passed in 2007 and 2008 as part of a free-trade agreement, that would allow exploitation of Peruvian rainforest, such as oil and gas concessions. As much of this area is on indigenous land, tribal groups argued the decrees would open up mineral and mining rights in a way that would threaten their ancestral lands and way of life.

On 5 June 2009, on a highway near the town of Bagua Grande, 1,000 km north of Lima, 2,500 Indians, many of them carrying spears and machetes, protested and blocked the road. Riots ensued when some 400 riot police tried to clear the roadblock, resulting in Peru's worst violence of the last decade. At least 31 people were killed, 22 tribesmen and nine policemen. Those nine were part of a group of 38 policemen who had been kidnapped, and nine of them were killed the next day when the army tried to free them. Twenty two escaped and seven were missing. The total number of casualties has remained unknown so far (late June 2009). Officials say at least 22 police and nine protestors died; protestors said 30 indigenous Indians were killed. According to some reports, the number of deaths is much higher, with a total of more than 100 indigenous protestors missing (BBC 2009).

Indigenous people said a demonstration escalated when police in helicopters opened fire on demonstrators. The authorities said the police were fired on first, and President Garcia accused the Indians of 'falling to a criminal level'. Indigenous leaders contradicted this version, and said they only carried traditional weapons. President Garcia, who had plans to open up communal jungle land for oil exploitation, logging, mining and large-scale farming, had declared earlier that 'all Peruvians should benefit from the country's natural resources, not just the people who happened to live in the areas concerned' (BBC 2009).

This conflict between indigenous people and the government, and, by extension, multinationals wishing to explore the natural resources of Peru's rainforest, attracted much international attention. Many (international) media reported widely about it (BBC 2009). In Peru itself, tribal groups had been protesting against a free-trade agreement with the USA since 2007, and the eruption of violence in 2009 made the government unpopular and divided the country over the issue. The government was blamed for its use of violence, and for not consulting native communities about a series of new laws which would affect them (BBC 2009). The approval rate of Peru's centre-right President Garcia consequently dropped to a low of 19 per cent, and some of Peru's neighbours also voiced criticism.

For the Peruvian government it meant bad public relations. Pictures, films, and eyewitness reports in the international media made this conflict in the Amazon rainforest an international affair. The criticism and negative publicity probably influenced the decision of the Congress of Peru, 2 weeks later (18 June 2009) to revoke the two controversial laws (BBC 2009). This decision was taken in the same period that the UN's Special Rapporteur for Indigenous People, James Anaya, visited Peru (17–19 June). Anaya said he had heard 'troubling allegations of abuse by security forces' and 'testimony of allegations of abuse that need to be taken seriously', and he asked for an investigation (BBC 2009).

Tropical deforestation and conflicts over land use

In many other rainforests around the globe, similar conflicts exist between forest inhabitants, in some cases indigenous people, and governments or multinationals wishing to explore rainforests. This exploration may take various forms: clearing forests for tropical hardwood, mining, or land conversion, transforming rainforest into agricultural land.

There appears to be a rise in the number of (violent) conflicts over land issues in many rainforests around the globe. What is rare, however, is that such a conflict in the middle of the Amazon should attract so much international attention. In this case, there happened to be photographs of the violent clashes, taken by eyewitnesses, two Belgians. Their eyewitness account and photographs was effectively made public by the UK-based non-governmental organisation (NGO) Survival International. Consequently, the Peruvian conflict quickly became visual news that went around the globe.

There are many other areas of rainforests, some of them very remote, such as, next to Peru, in the interior of the Brazilian Amazon, where images of conflicts between forest people and governments or commercial companies do not become global news. Most conflicts over land issues in rainforests hardly reach the international news media, or are never reported. Considering, however, the age of globalisation and the increasing accessibility of electronic equipment all around the globe (such as mobile phones that can film), it is becoming more likely that violent conflicts will be photographed or filmed and internationally transmitted by media.

Conflicts in rainforests over land use, like the recent one in Peru (so far to the advantage of the indigenous people), are an expression of the growing pressure on the tropical rainforests around the globe. Rainforests are cleared at the speed of several football fields a minute (such as in Brazil and Indonesia), for logging, mining or agricultural exploitation. Most tropical forests are inhabited by humans, who for their livelihood are at least partly dependent on them, and increased deforestation is leading to growing conflicts. As forest people and especially indigenous people are often found at the bottom in society, and considering the bad human rights records of some equatorial countries (or in the case of South America, a history of dictatorships and military rule that shaped violent and authoritarian societies), the rights of forest people are regularly abused. Representatives of law and order frequently commit crimes themselves, such as intimidation, abuse and extrajudicial killings.

Deforestation is obviously not only problematic to the people living in forests, but it also threatens animal and plant species. Tropical rainforests contain a very large number of animal and plant species and are the most biodiverse ecosystems (Wilson 2003). While representing no more than 6 per cent of the earth's surface (some sources say only 3 per cent), they house at least more than half, and maybe even two-thirds or more of all known species. As a result,

rapid tropical deforestation poses a threat to the survival in the wild of many species.

Deforestation of tropical rainforests is often illegal (Boekhout van Solinge 2008a), and much of it could and should be considered criminal. Besides being often illegal, tropical deforestation is also harmful, considering its effects on humans, other living beings and ecosystems. The Amazon rainforest, for example, contains around 30 per cent of all known species. One hectare of Amazon rainforest has a larger variety of trees than is found in Europe. The Amazon contains approximately 20 per cent of the planet's river water, and some 5 per cent of the Amazon is flooded during part of the year, sometimes to several metres, creating a unique ecosystem. The naturalist Alfred R. Wallace visited the Amazon prior to his later study, which resulted in his famous book, *The Malay Archipelago: The Land of the Orangutan and Bird of Paradise* (1869), dedicated to his friend and colleague Charles Darwin, who had published *The Origin of Species* (1859) 10 years earlier. After his visit to the Amazon, Wallace suggested that its diversity of animals and plants seemed to be determined by the many waterways, forming barriers that had, over long periods of evolution, led to a differentiation of species (Roosmalen 2008). Logically, therefore, deforesting an area almost automatically means that some species may be threatened.

As tropical deforestation is harmful to humans and non-humans, it is an area of research that fits well into the realm of green or environmental criminology. Although green or environmental criminology explicitly takes the harm principle as a starting point (Beirne and South 2007; Sollund 2008), this, of course, is not unique to this type of criminology. All criminology, and criminal law as well, looks at activities that are in one way or the other, at least by some people, considered harmful. Green or environmental criminology, however, such as in this chapter about tropical deforestation, explicitly addresses environmental or ecological harm, as well as the issue of ecological justice (White 2008): who has 'rights' to rich natural environments such as tropical rainforests?

The harm rapid tropical deforestation causes may be clear to many, but (illegal) tropical deforestation is a subject criminologists generally pay little attention to. Some research is being done, such as on illegal logging, but almost exclusively by NGOs. Some NGOs produce impressive studies on, for example, wildlife and the timber trade, based on difficult research, such as various studies by the

Environmental Investigation Agency (EIA) and Telapak (2004, 2005, 2006), but the attention from criminologists, so far, has been limited.

This chapter addresses tropical deforestation as a harmful and criminological issue. The main focus will be on the Amazon, the largest rainforest on the planet, found around the South American equator. Most deforestation in the Amazon is illegal and is harmful to its inhabitants, humans and non-humans, as well to the Amazon ecosystem. Moreover, conflicts over land use like the recent one in Peru regularly occur, including human rights abuses of forest inhabitants. In the much larger Brazilian Amazon, conflicts over land occur even more often, especially since more Brazilian than Peruvian rainforest has been cleared. The Brazilian deforestation case is different in the sense that logging and mining are no longer the main causes of deforestation. Land conversion, changing rainforest into agricultural land (in particular, cattle ranching), has been driving deforestation in the Brazilian Amazon for the last 15 years.

This research is an extension of earlier research and publications on tropical deforestation, such as the profitable international trade in 'conflict timber' (sold to fund conflicts) and illegal timber, and deforestation in west Africa and central Africa, as well as the South-East Asia islands of Sumatra, Borneo and New Guinea (Boekhout van Solinge 2008a-c). With the earlier case studies on the large equatorial rainforests of Africa (Congo basin) and Asia (Sumatra, Borneo and New Guinea), this study on the equatorial rainforest of the Amazon completes a series of publications addressing deforestation problems in the largest equatorial rainforests. In order of completeness, the final section of this chapter will address deforestation issues in equatorial Africa and Asia and make some comparisons with the Amazon, the main focus of this contribution.

The presented data of deforestation cases in the Amazon and on the island of Borneo are partly derived from (ethnographic) field visits and interviews. The Brazilian states Amazonas and Pará were visited in 2003 and 2009, and Indonesian Borneo (Kalimantan) in 2007. All other data are based on scientific literature, press articles and reports by NGOs.

Deforestation, conflict and crime in Amazonia

Over half of Peru is covered by rainforest. The Peruvian rainforest is the biggest stretch of the Amazon valley outside Brazil. The conflict in Peru between indigenous people and government forces was part

of a longer-lasting process or rising conflicting interests over Peru's Amazonian rainforest.

In September 2006, indigenous communities of the Peruvian Amazon protested against oil companies. The Federation of Native Communities of the Corrientes river in the North of Peru (FECONACO) complained about pollution. FECONACO declared that for every barrel of oil there are nine barrels of contaminated water as a by-product – a total of more than a million barrels a day. The Achaur people, who have lived in the area for thousands of years, say the water contains high concentrations of hydrocarbons and heavy metals (lead, cadmium, mercury and arsenic) that is destroying the fragile ecosystem in which they live, killing the fish and wildlife and contaminating their water sources. A survey by Peru's Health Ministry that year indeed revealed that cadmium levels in the blood of more than 98 per cent of the Achuar exceeded safe levels. Robert Guimaraes, vice-president of another NGO, AIDSESEP (Inter-Ethnic Association for the Development of the Peruvian Jungle), said that 'the oil companies, with the complicity of the state, are systematically violating our human rights' (BBC 2006). In October 2006, oil tappers in the Amazon were trapped as indigenous communities surrounded the three facilities to protest about the water pollution.

In 2007, this was followed by more protests, as the Peruvian government decided to auction off large swathes of the Amazon valley to oil and gas companies. This decision was denounced by environmental and human rights groups, who said the amount of Peruvian territory Amazon open to exploitation would increase from 13 per cent to 70 per cent. An area the size of California was already signed over for auction to oil companies. President Garcia said his policy was an investment shock in a country where more than half of the population live below the poverty line (BBC 2007). More protests followed in 2008, with indigenous protestors blocking roads and energy installations. Representatives of some 65 Amazon tribes said that when 70 per cent of the Peruvian Amazon is leased for oil and gas exploration, big energy companies could buy up the land, putting their lives and the biodiversity of the Amazon at risk (BBC 2008). A state of emergency was declared in 2008 after thousands of Amazonian tribespeople armed with spears and bows and arrows blocked roads and took over a hydroelectric dam and oil and gas installations in three provinces (Cusco, Loreto and Amazona). In Bagua province (where the later deadly violence occurred in 2009), 800 demonstrators clashed with police.

If we look at the recent history of conflict over rainforest land use in northern Peru, it becomes clear that the outbreak of violence in 2009 had a history of several years of growing tensions. Indigenous tribes have protested over current pollution and further rainforest exploitation, fearing this would mean a threat to their survival. After the declaration of a state of emergency in 2008, indigenous protests grew in size and intensity. In 2009, massive rallies involved some 30,000 people, with Indians blocking roads and bridges and occupying installations vital to the country's economy. By mid-May 2009, the Peruvian army was called in, resulting 2 weeks later in the violent escalation.

The conflict over Amazon rainforest in Peru is not unique. In different countries of the Amazon rainforest, similar conflicts are happening. In neighbouring Brazil, these types of conflicts also occur, seemingly on a larger scale, because of its much larger share of the Amazon. Sixty-seven per cent of the Amazon rainforest is found within Brazil's borders. The Peruvian share of the Amazon is much smaller – 10 per cent of the total Amazon basin (Goulding *et al.* 2003: 16). Brazil is the fifth largest country of the world, smaller than the USA and larger than Australia. In population terms, approaching 200 million inhabitants, it is also among the most populous countries. Brazil has many natural resources, which are exploited for its large internal market as well as export markets. Brazil is, for example, the largest iron producer of the world. Many of its natural resources are found and are being exploited in the Amazon basin. As part of the policy of economic growth, Brazil, just like Peru, intends to exploit many more of its natural resources.

Because 40 per cent of the Brazilian territory is formed by the Amazonian ecosystem, it is also a country with many forest inhabitants. Some 20 million people live in the Brazilian Amazon. In the last census (2005), 519,000 Brazilians classified themselves as indigenous. Other estimates put the number of indigenous peoples (of some 200 different tribes), depending on the definition, at 200,000–700,000 – of a population that once counted several millions before Europeans arrived. Some 50 groups in the Amazon still do not have regular contact with the outside and keep away from it.

Since the 1970s, parts of the Brazilian Amazon have been opened up for further economic exploitation, such as by the construction of highways and dams. Logging for tropical timber is the best-known type of tropical deforestation. In the 1980s, (illegal) logging in the Brazilian rainforest led to international concern and criticism. The emphasis that is sometimes put on (illegal) logging as a cause of

deforestation may distract attention from other, more important causes of deforestation. Mining, for example, is another important cause of deforestation of the Brazilian Amazon, and often has more devastating effects on the Amazonian ecosystem than logging.

By 2001, about 837,000 km² of Amazon rainforest had been cleared, with a 1990s gross rate of approximately 25,000 km² per year; 80 per cent of deforestation has been in Brazil. In 1988–2006, the deforestation in Brazilian Amazonia averaged 18,100 km² per year. It peaked in 2004 with 27,400 km², before gradually decreasing to some 11,000 km² in 2007 (Malhi 2008: 169).

The process of clearing forests and converting them into mining projects and, increasingly, agricultural land, has led to an increase in conflict between forest inhabitants and those wishing to exploit and 'develop' the area. A very recent and still continuing conflict over a new mine project is taking place near the town of Juruti, in the middle of the Amazon, where Alcoa, the world's largest aluminium company, is digging a new, large bauxite mine. Communities living in forests that are planned to be deforested (in total some 9,000 people), protested at the Alcoa plant in Juruti in January 2009. Hundreds of protestors arrived by boats at the plant, which was protected by heavily armed police, who used teargas to drive away the protestors. So far, the protests of the forest communities near Juruti, who see their forests with important food and medicinal trees being destroyed, have not been successful. In the international press, reports about the new Alcoa plant in Brazil seem rather positive, and the protests did not get any international media attention at all. The protest leader from the forest communities who was met and interviewed (in Santarem, Pará, February 2009) had come to the city to get more attention for their case and managed to get an interview in a small local paper.

Pirate cows and soybean on former rainforest

Today, clearing forests for timber and mining is no longer the main cause of deforestation in the Amazon. Land conversion, transforming tropical rainforest into agricultural land, has become the main cause of deforestation since the 1990s. While the deforestation rate in the Brazilian Amazon had slowed down by the late 1980s (to an annual 10,000 km²), it increased again until 1995 (27,000 km²), mainly as a result of establishing cattle ranches on former rainforest soils. Cattle ranching has led to some 70 per cent of deforestation of the Brazilian Amazon (Malhi 2008: 169). With a growing cattle herd that today is

over 200 million (more than the people), Brazil has become, since 2003, the world's largest beef exporter. The cattle numbers have grown especially in the state Mato Grosso (in the southern Amazon) and to a lesser extent in the state Pará (in the north-eastern Amazon). The expansion of cattle ranching in the Brazilian Amazon has even led to a new term, 'cattelization'.

The cattle ranches are often owned by big landowners, sometimes from the south of Brazil, who manage to get permits to clear an area, legally or illegally. It furthermore regularly occurs that more than the allowed 20 per cent of the area is being cleared, which means that the cows are there illegally. In Brazil, these illegally grazing cows are called 'pirate cows'. Illegal clearing, however, in general is not much enforced, although some improvements have been made.

Some of the big cattle ranches, especially in remote areas in the Amazon, are associated with forms of slave labour (officially described as working conditions akin to slavery). Some cattle ranches, and increasingly sugar-cane plantations (for ethanol production), keep workers in debt bondage and have armed guards to prevent them from leaving. The government fights this slave labour with a special task force, established in 1995, that raids large farms and businesses. Every year, several thousands are freed from slavery. Since 1995, 33,000 people have been thus freed. 2007 was a record year with almost 6,000 people being freed. In 2008, their number was 3,000. It is estimated that at least 25,000 Brazilians continue to toil in debt slavery conditions.

Over the last 10 years, another, relatively new and rapidly growing cause of deforestation (although much less important than cattle) has been the cultivation of soybeans. Since the late 1990s, soybean cultivation has grown rapidly, especially in the states of Mato Grosso and Pará, both in the Amazon region. Brazil now has become the largest soybean exporter of the world. Most of the crop is used as cattle food, with the USA, the Netherlands and China as the main destinations. Part of the soybeans imported into The Netherlands is exported further into Europe, but The Netherlands, with its intensive agriculture (cows, pigs, poultry) imports a quantity of soybeans that is grown on an area the size of half The Netherlands (Verweij *et al.* 2009).

In the Brazilian Amazon, deforestations for cattle and soybeans go hand-in-hand, for which reason some authors speak of the beef-soybean complex (Verweij *et al.* 2009). Deforestation for cattle and soybeans has only increased the already existing conflicts between forest exploiters and forest inhabitants. Cattle and soybeans have

only added new reasons for deforestation and potential conflict, next to the longer existing causes of deforestation such as mining, logging, and the cultivation of sugar cane.

Conflicts and human rights violations against forest inhabitants are common, and various organisations have been set up to support them and publish reports about crimes. Greenpeace (2003), for example, published a well-documented report: *State of Conflict. An Investigation into the Landgrabbers, Loggers and Lawless Frontiers in Pará State, Amazon*. It describes in detail how, in the state of Pará, human rights are violated on a regular basis when areas are being deforested. It is not uncommon for locals to be driven away from forest communities by gunmen.

CIMI, the Indigenous Missionary Council, has addressed violence against indigenous peoples in Brazil for more than 20 years. It publishes annual reports with detailed reports of violence against indigenous property, territorial conflicts, environmental damage of indigenous areas, and violence against indigenous individuals, such as murders, murder threats and acts of racism (CIMI 2009). Every year, CIMI reports numerous cases, including the murders of several dozens of indigenous people, including minors, by loggers, miners or other land grabbers. CIMI also reports about the high suicide rate among Brazilians Indians of several tribes. This occurs especially in the state Mato Grosso do Sul, known for its deforestation for soybean and sugar-cane plantations, such as among the Guarani-Kaioiwá people. On 19 April 2009, the Day of the Indian, 500 indigenous leaders from all over Brazil met in the state Mato Grosso do Sul. They interpreted the day as 'a day of struggle', and declared: 'Our spirit of struggle and resistance is the only way to face the ranchers, gunmen and police, because the State does not protect the people' (www.cimi.org.br).

The Pastoral Land Commission (CPT) (Comissão Pastoral da Terra) is a Catholic Church organisation that deals with agrarian land reform and also reports on violence over land issues. It has many local branches and in the city of Santarém, in the state of Pará, also home of a large soybean export harbour (800 km from the Atlantic), CPT today has a special group that studies the soybean cultivation in the area. As international soybean prices were high the first years of this century, soybean cultivation grew rapidly around Santarém. In an interview (February 2009, Santarém), a CPT representative explained that conflicts have regularly occurred between forest inhabitants and soybean farmers who wish to clear the area. These 'new landowners' or 'land grabbers' are often accompanied by armed personnel or

armed officials and sometimes show some kind of documents to the mostly illiterate inhabitants of forest communities.

Most of the deforestation in Brazil is illegal, as several studies show. Greenpeace Brazil (especially in Manaus, capital of state of Amazonas) has monitored it for years, using all available data and its own technical equipment, and has built up professional knowledge (as appeared from various interviews, April and May 2009). Greenpeace Brazil estimates that 60–80 per cent of the total deforestation in the Brazilian Amazon is illegal. Studies by Greenpeace, CIMI and CPT show that human rights are commonly violated in the process of deforestation in the Brazilian Amazon. The many case studies that are known over land use in the Amazon suggest that in conflicts over land use, forest inhabitants such as indigenous people are those who generally lose out and see their human rights abused. The case described at the beginning of this chapter, of protesting Amazonian tribes in Peru who successfully managed to get 'deforestation laws' be revoked by Congress, is therefore atypical.

Deforestation in equatorial Africa and Asia

The second and third largest rainforests of the planet, after the Amazon, are found further along the equator, in respectively central Africa, the Congo basin, and on the large tropical islands of Asia: Sumatra, Borneo and New Guinea. All these equatorial rainforests also suffer from large-scale deforestation.

What distinguishes these rainforests from the Amazon is that they grow on much more fertile soils and support much larger mammals. The Amazon basin, considering its extremely poor soils, does not seem capable of supporting large leaf-eaters (the only exception being the tapir), as the poor soils oblige plants to biochemically protect their leaves, necessary to catch energy in the form of sun (Roosmalen 2008: 136). For example, the Amazon 'only' has small monkeys of no more than 13 kg, whereas Africa and Asia have great apes, the animals genetically closest to humans, some with a (much) larger body weight than humans. All of the great apes are today threatened by deforestation and poaching. The orangutan in Borneo, and even more so in Sumatra, is seriously threatened, and the same is true for all great apes in Africa, not only the chimpanzee but particularly the gorilla (especially the eastern gorilla, with some 700 left) and the bonobo (maybe down to fewer than 5,000) in central Africa.

Equatorial Africa has known many armed conflicts, killing millions of people. In Rwanda, a large genocide took place in 1994, in which 800,000, mostly Tutsis, were killed. West of Rwanda, in the Democratic Republic of Congo (D.R. Congo), a conflict ended, or was reduced, in 2003. In Africa, it was referred to as the 'African World War', as nine African countries were involved in the war, in which some four million people died, the largest human loss since World War II.

The wars are obviously harmful to many people, but also to animals and the ecosystem. The abundant presence of natural resources in the Congo basin was the main reason for various countries to be involved in the Congo conflict. Control of natural resources was the key to income, and exploitation of the natural resources by government and rebel troops, kept the conflict alive. The African continent in general is rich in natural resources such as oil, gold, diamonds, and many other precious stones and minerals.

Less known than the diamond and gold mines are the tin, cobalt and coltan mines, which are especially found in D.R. Congo. Cobalt and coltan have been much in international demand over the last years for their use in electronic equipment such as mobile phones and laptops. D.R. Congo is the world's top producer of cobalt with 40 per cent of world production and one-third of world reserves. Of coltan, D.R. Congo has 60–80 per cent of the world's reserves. During the Congo war the coltan mines in the east of the D.R. Congo helped fund the conflict, and much of the coltan was smuggled out of the country to meet international demand. Increased coltan mining has destroyed the habitat of the mountain gorilla. As some gorillas live on 'coltan land', increasing use of mobile phones therefore is destructive to gorilla habitats. It has been suggested that avoiding multiple purchases of mobile phones may help to limit the destruction of forests via the opening of the new coltan mines in areas inhabited by gorillas in the DR Congo (Krief 2006).

Another important cause of deforestation in central Africa is logging. A problem particularly related to logging in Africa is that it further stimulates poaching and the trade in 'bushmeat'. A logging road means a major incursion into a forest, which is usually difficult to access. Logging roads enable hunters to go further into the forest, and make it easier to reach distant markets as well (Boekhout van Solinge 2008b).

Hunting wild animals is a common practice in many parts of Africa, the world's economically poorest continent. In Africa, logging leads to increased hunting and trade in so-called bushmeat. In cases of war, the practice of eating bushmeat increases due to less stable food markets and armed men roaming the country.

The illegal commercial hunting of African wildlife for sale as bushmeat has reached alarming levels, and immediate action is needed before it is too late (Bowen-Jones 2005: 133). The bushmeat varies from deer, gorillas and chimpanzees to crocodiles and elephants (Frank 2001). The bushmeat trade only further increases the endangerment of African wild animals such as great apes.

Not only in Africa, but also in Asia great apes are threatened with extinction. Asia's only great ape, the orangutan, lives on the islands of Sumatra and Borneo. When Alfred R. Wallace visited the islands in the mid-nineteenth century (as reported in *The Malay Archipelago: The Land of the Orangutan and Bird of Paradise*), these islands were still covered with rainforest. Many wild animals such as tigers, orangutans and birds of paradise lived in the forests. In the twentieth century, however, the Javanese and Balinese tiger became extinct and the number of orangutans declined by 90 per cent. The Sumatran tiger is today threatened by logging and poaching, just like the orangutans on Sumatra and Borneo, whose number are literally plummeting. If current trends continue, wild orangutan populations might be extinct in 20 years.

The deforestation rate in Indonesia, such as on Sumatra and Indonesian Borneo (Kalimantan), may even be higher than in the Amazon. Logging for timber, mostly illegal, and land conversion (especially for palm oil plantations) and, to some extent, paper (the world's two largest paper mills are found in Sumatra) are important causes of deforestation (Boekhout van Solinge 2008c). All national parks and protected forests in Indonesia suffer from illegal logging practices. Just as in the Amazon, conflicts over land use occur, as logging and mining often pollute (drinking and bathing) water and limit food sources.

Some of the illegal timber (e.g. logged in national parks) is being smuggled to neighbouring Malaysia, which exports surprisingly large quantities of tropical hardwood. Considering the timber-smuggling operations from Sumatra to peninsular Malaysia and from Indonesian Borneo (Kalimantan) to Malaysian Borneo (Sarawak and Saba), the Malaysian timber exports logically include illegal timber from Indonesia. In the Indonesian peninsula, deforestation has been moving from west to east. In the west, large parts of Indonesian Sumatra have already been logged. In Indonesian Borneo, much lowland has been logged and more is being logged. In recent years, the large eastern Indonesian province of Papua on the island of New Guinea has become the focus of large illegal logging operations, involving the Indonesian army and Malaysian timber traders (EIA

and Telapak 2005). Their main target is the valuable merbau timber, which has flooded, sometimes via China, the Western timber and flooring markets.

The bird of paradise, almost exclusively found on the island of New Guinea, the world's largest tropical island and one of its most pristine natural places, was almost extinct a century ago. What threatened the bird of paradise was the women's fashion, especially in Europe, to use its feathers and sometimes complete birds as an ornament or jewellery of nature, to be worn as a hat or dress (Boekhout van Solinge 2008c). The famous and mythical bird of paradise did, however, not become extinct as a result of the growing consciousness that it could become extinct, leading to conservation measures, a ban trading it internationally, and collaboration between scientists and conservation movements.

Scientific arguments to preserve the bird of paradise for future generations eventually won over the commercial ones, although sentiment played a part as well. 'This combination of science and sentiment, as in contemporary environmental campaigns, put the economic arguments in favour of bird-of-paradise hunting at a great disadvantage' (Cribb 1997: 404). The analysis of the conservation history of the bird of paradise, saved almost a century ago, can serve as an example of how to conserve other species as well: 'The arguments for environmental protection have arisen primarily out of a modern, scientific understanding on the world. Thus the argument for conservation rests on an understanding that the extinction of a species is possible and that this can happen both by direct extermination and by destruction of its habitat' (Cribb 1997: 380–381).

Addressing and tackling tropical deforestation

This chapter discussed in a 'world tour' around the equator different problematic (harmful) aspects of tropical deforestation. Three types of, often illegal, activities characterise the deforestation of tropical rainforests today: logging, mining and land conversion for agriculture. Generally, more than half and sometimes most of the logging practices in tropical countries are illegal. Mining projects are another important cause of tropical deforestation. Land conversion, however, changing rainforest into agricultural land, is currently the main cause of tropical deforestation, especially in the Amazon.

The effects of deforesting the world's tropical rainforests are enormous. One can easily speak of an ecological disaster, something

that could be labelled as ecologically harmful and an ecological crime. Forests disappear at such great speed that habitats for many forest inhabitants and wild animals as well are rapidly shrinking. Considering the rate of tropical deforestation, it is no surprise that forest inhabitants increasingly protest against the destruction and pollution of their environment, sometimes leading to violent conflicts.

Besides being problematic for those immediately affected by it, such as humans and animals living in and off those forests, tropical deforestation is now becoming an international political issue because it is responsible for 20 per cent of global greenhouse emissions. Indonesia and Brazil have now become respectively the third and fourth CO₂-emitting countries of the world, mainly as a result of clearing rainforest. Because of its influence on greenhouse emissions and climate change (see, for example, the Assessments Reports by the Intergovernmental Panel on Climate Change (IPCC)), tropical deforestation has truly become a global issue.

At the UN level, policies are being developed to reduce emissions by decreasing deforestation (REDD). Billions of dollars are available, but the big question is, who exactly is to pay for the preservation of rainforests? How can this money be spent in order to have the largest guarantee that the rainforests will indeed, in the general interest, be preserved? A question for the (near) future will be: how can the forest preservation be enforced and how can forest crime be prevented?

One way, today and in the future, that may help to preserve rainforests, limit forest crime and increase ecological justice is by pointing at the harm that is currently done to rainforests and their inhabitants, human and nonhuman. Growing awareness of the harm that is being done may stimulate citizens and governments to change their behaviour. For example, not many people are yet aware of the fact that the meat industry has been the driver of deforestation in the Amazon over the last 15 years. Addressing this deforestation problem therefore should include challenging high meat consumptions, the growing use of soybeans as cattle food, and the influence of the food industry (Pollan 2008).

Criminologists, lawyers, law enforcers and policymakers can also address tropical deforestation, an area of many criminal and otherwise harmful activities, while law enforcement is mostly absent. It can be argued that preservation of tropical rainforests is in the human interest (as a source of water, carbon, botanical knowledge and medicine, pleasure, etc.). If the latter argument is followed, we could argue that the (illegal) deforestation of tropical rainforests is

harmful and thus deserves more attention from criminologists and other professionals. Maybe social scientists have a special role to play here. When we teach university students that hunter and gatherer societies are the oldest form of human society, we should maybe add in our lectures that these old societies still exist, but they are seriously threatened by tropical deforestation.

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